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Abstract

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Interstellar Probe Mission/System Concept

Richard A. Wallace, Juan A. Ayon, and George S. Sprague
Jet Propulsion Laboratory/California Institute of Technology

NASA's Interstellar Program was begun in the Spring of 1999 after a year of advanced mission and program planning activities, reported previously in a paper delivered at the 1999 IEEE Aerospace Conference. This abstract summarizes progress towards defining the first mission in the Interstellar Program – Interstellar Probe. This mission will be the first to probe the interstellar medium with a complete set of scientific instruments designed for such exploration. This mission is expected to be a precursor and a significant testbed for technologies being developed for eventual travel to the nearest star.

Exploration of the interstellar medium is the objective of the Interstellar Probe mission. The interface between our solar system and galaxy defines the crossover into the interstellar medium and is the minimum target distance. This distance is thought to be beyond 125 AU. A mission requirement, therefore, is to reach 200 AU in fifteen years or less with a scientifically capable payload package. Time and distance are key design requirements and advanced propulsion technology a key enabler of the Interstellar Probe mission.

Another key mission goal is launch in the 2010 time period; thereby setting associated advanced technology goals of readiness by 2007. Solar sail propulsion has been baselined for the mission design. Key trades are sail technology development requirements as a function of trip time to 200 AU and the payload mass that can be delivered and operated at that distance. This paper provides technology trade information, strawman payload measurement requirements, baseline system design, including a configuration concept. Alternate technology options are described.

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